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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/622,147	10/30/2000	Mohammed Javed Absar	851663414USP	8294

7590 07/13/2005

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EXAMINER	
FLANDERS, ANDREW C	
ART UNIT	**PAPER NUMBER**
2644	

DATE MAILED: 07/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/622,147	ABSAR ET AL.	
	Examiner	Art Unit	
	Andrew C. Flanders	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 June 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8-20 and 23-66* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *48-66* is/are allowed.

6)☒ Claim(s) *1-6,8-11,17-20,23-25,31-35 and 45-47* is/are rejected.

7)☒ Claim(s) *12-16, 26-30, 36-44* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 August 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 – 6, 8 – 11, 17 – 20, 23 – 25, 31 - 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over ATSC in view of Castelaz (U.S. Patent 5,003,490).

Regarding **Claim 1**, ATSC discloses for each audio channel, examining the variation in exponents over frequency and time (i.e. determining a first variation of exponent values within a first exponent set) and sending new exponents when the variation exceeds a threshold (i.e. assigning an exponent coding strategy to the first exponent set based on the determine first variation) (section 8.2.8 page 103), differential coding in which the exponents for a channel are differentially coded across frequency and successive exponents are sent as differential values which must be added to the prior exponent value in order to form the next absolute value (i.e. determining a second variation of exponent values between said first exponent set and each subsequent exponent set in said sequence) and the differential exponents are combined into groups in the audio block and the grouping is done by one of three methods D15, D25 or 045 which are referred to as exponent strategies (section 7.1 .1

page 45) (i.e. assigning an exponent coding strategy to the first exponent set based on the determined first and second variations).

ATSC does not disclose the steps of determining the first and second variations are performed utilizing two-layer neural network processing.

Castelaz discloses a neural network signal processor that can receive and analyze raw audio data (col. 2 lines 38 - 47) (i.e. wherein the steps of determining the first and second variations are performed utilizing two-layer neural network processing).

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Castelaz to function as the determining process of ATSC. One would have been motivated to do so to reduce preprocessing required for determining; see Castelaz col. 2 lines 30 – 35.

Regarding **Claims 2 and 45**, in addition to the elements stated above regarding claim 1, ATSC further discloses the differential exponents are combined into groups in the audio block and the grouping is done by one of three methods D15, D25 or D45 which are referred to as exponent strategies and the number of exponents in each group depends only on the exponent strategy (section 7.1.1 page 45) (i.e. wherein the exponent coding strategy is assigned from a plurality of exponent coding strategies having different differential coding limits).

Regarding **Claims 3, 17 and 46**, in addition to the elements stated above regarding claim 2, ATSC discloses combining the differential exponents into groups

done by three methods which are referred to as exponent strategies (section 7.1 .1 page 45) (i.e. a step of coding said first exponent set according to the assigned exponent coding strategy).

Regarding **Claim 4**, in addition to the elements stated above regarding claim 3, ATSC further discloses looking at the variation of exponents over time and when the variation exceeds a threshold, new exponents will be sent (section 8.2.8 page 103).

Regarding **Claim 5**, in addition to the elements stated above regarding claim 4, ATSC further discloses that if the spectrum changes little over the 6 blocks in a frame the exponents will be reused for blocks 1 -5 (section 8.28 page 103) (i.e. wherein the plurality of exponent coding strategies includes an exponent set re-use strategy that is assigned to the at least one subsequent exponent set).

Regarding **Claim 6**, in addition to the elements stated above regarding claim 5. ATSC further discloses looking at the variation of exponents over time and when the variation exceeds a threshold, new exponents will be sent (section 8.2.8 page 103) (i.e. comprising a step of coding said first exponent set and said at least one subsequent exponent set according to the corresponding assigned coding strategies).

Regarding **Claim 8**, in addition to the elements stated above regarding claim 7, Castelaz discloses the neural signal processor comprises a layer of input processing

units connected to other layers of similar neurons (col. 2 lines 49 - 50) (i.e. wherein the neural network processing includes first and second neural layers) and the signal is propagated through the NSP until an output is produced by the neurons in the output layer. In the "typical" neural net model, the learning algorithm will attempt to minimize the difference between the actual and the desired output by effecting a change in the synaptic weights between the neurons (col. 3 lines 35 - 41) (i.e. the first neural layer computing weighted sums of its inputs, and the second neural layer determining a coding strategy for a selected output from the first neural layer).

Regarding **Claims 9, 23 and 35** in addition to the elements stated regarding claims 1, 17 and 31, Castelaz discloses a feature extraction stage that extracts certain features from the signal (col. 4 lines 60 - 61) (i.e. wherein the neural network processing comprises a feature extraction stage in which said sequence of exponent sets is utilized to determine said second variations) each of the connections between the neurons contain weights (col. 5 lines 38 - 40) the signal is propagated through the NSP until an output is produced by the neurons in the output layer. In the "typical" neural net model, the learning algorithm will attempt to minimize the difference between the actual and the desired output by effecting a change in the synaptic weights between the neurons (col. 3 lines 35 - 41) (i.e. a weighted routing stage in which said second variations are weighted according to predetermined weighting values and routed to inputs of a first neural layer) next, the input signal will be advanced one step through the sampling circuit (col. 3 lines 42 - 43) (i.e. a selection stage in which an output of the first neural

layer is selected and an output processing stage), and a changing set of inputs teaches the net to produce a single output response (col. 3 lines 25 - 26) (i.e. a coding strategy is assigned to said first exponent set based on said first variation and the output of said selection stage).

Regarding **Claims 10 and 24**, in addition to the elements stated above regarding claims 9 and 23, ATSC further discloses the differential exponents are combined into groups in the audio block and the grouping is done by one of three methods D15, D25 or D45 which are referred to as exponent strategies and the number of exponents in each group depends only on the exponent strategy (section 7.1.1 page 45) (i.e. wherein a coding strategy is assigned to at least one subsequent exponent set on the basis of the output of said selection stage).

Regarding **Claims 11 and 25**, in addition to the elements stated above regarding claims 10 and 24, ATSC further discloses that if the spectrum changes little over the 6 blocks in a frame the exponents will be reused for blocks 1 –5 (section 8.28 page 103) (i.e. wherein the coding strategy assigned to the at least one subsequent exponent set is an exponent re-use strategy).

Regarding **Claim 17**, in addition to the elements stated above regarding claim 3, ATSC further discloses mapping exponential values for similar exponent sets (page 43

– 44) (i.e. to determine the maximum number of exponent sets that are similar to a given exponent set).

Regarding **Claim 18**, in addition to the elements stated above regarding claim 17, ATSC further discloses the differential exponents are combined into groups in the audio block and the grouping is done by one of three methods D15, D25 or D45 which are referred to as exponent strategies and the number of exponents in each group depends only on the exponent strategy (section 7.1.1 page 45) (i.e. wherein each of the plurality of exponent coding strategies corresponds to different differential coding limits).

Regarding **Claim 18**, in addition to the elements stated above regarding claim 17, ATSC further discloses the differential exponents are combined into groups in the audio block and the grouping is done by one of three methods D15, D25 or D45 which are referred to as exponent strategies and the number of exponents in each group depends only on the exponent strategy (section 7.1.1 page 45) (i.e. wherein each of the plurality of exponent coding strategies corresponds to different differential coding limits).

Regarding **Claim 19**, in addition to the elements stated above regarding claim 17, ATSC further discloses that if the spectrum changes little over the 6 blocks in a frame the exponents will be reused for blocks 1 -5 (section 8.28 page 103) (i.e. selecting one of said subsequent exponent sets on the basis of said first variation and assigning an exponent re-use coding strategy to the selected exponent set and any

exponent sets in said sequence between the first exponent set and the selected exponent set).

Regarding **Claim 20**, in addition to the elements stated above regarding claim 17, ATSC further discloses differential coding in which the exponents for a channel are differentially coded across frequency and successive exponents are sent as differential values which must be added to the prior exponent value in order to form the next absolute value (i.e. determining a second variation of exponent values between consecutive exponents in said first exponent set) and the differential exponents are combined into groups in the audio block and the grouping is done by one of three methods D15, D25 or D45 which are referred to as exponent strategies (section 7.1 .1 page 45) (i.e. wherein the exponent coding strategy for said first exponent set is selected on the basis of said first and second variations).

Regarding **Claims 31, 45 and 47**, in addition to the elements stated above regarding claims 1 - 6, ATSC discloses determining the first and second variations but not utilizing neural network processing. Castelaz discloses a neural network signal processor that can receive and analyze raw audio data (col. 2 lines 38 - 47) (i.e. utilizing two layer neural network processing) and each pair of differential exponents is represented by a single mapped value in the bit stream (page 46 in ATSC) (i.e. a mean average difference calculation between consecutive exponent values).

Regarding **Claim 32**, in addition to the elements stated above regarding claim 31 , ATSC further discloses the differential exponents are combined into groups in the audio block and the grouping is done by one of three methods D15, D25 or D45 which are referred to as exponent strategies and the number of exponents in each group depends only on the exponent strategy (section 7.1.1 page 45) (i.e. wherein the exponent coding strategy is assigned from a plurality of exponent coding strategies having different differential coding limits).

Regarding **Claim 33**, in addition to the elements stated above regarding claim 31, ATSC further discloses looking at the variation of exponents over time and when the variation exceeds a threshold, new exponents will be sent (section 8.2.8 page 103) (i.e. wherein the neural network processor also selects and assigns an exponent coding strategy to at least one of the subsequent steps).

Regarding **Claim 34**, in addition to the elements stated above regarding claim 33, ATSC further discloses that if the spectrum changes little over the 6 blocks in a frame the exponents will be reused for blocks 1 -5 (section 8.28 page 103) (i.e. wherein the exponent coding strategy assigned to the at least one subsequent sets is an exponent re-use strategy).

Response to Arguments

Applicant's arguments filed 9 June 2005 have been fully considered but they are not persuasive.

Applicant alleges:

> "Because of the operational requirements and circuit architecture relied upon by Castelaz et al., a two-layer neural network signal processor would not function to accomplish the objectives of Castelaz et al."
>
> "Turning to claim 1, a method for processing data in an audio data encoder is provided that includes determining a first variation of exponent values within a first exponent set, determining a second variation of exponent values between the first exponent set and each subsequent exponent set in the sequence using two-layer neural network processing. As discussed above, nowhere do Castelaz et al., taken alone or in any combination with ATSC, teach or suggest the use of two-layer neural network processing for encoding audio data."

Examiner respectfully disagrees with this allegation. Applicant is merely making a statement that a two-layer neural network processor could not function to accomplish the objectives of Castelaz. Such an allegation cannot be made without providing evidence known by one of ordinary skill in the art or provided by in the applied prior art. Examiner believes that a two layer neural network processor could be used to function as Castelaz has suggested. Examiner points to col. 1 lines 62 – 64 in which Castelaz teaches that there are a wide variety of neural net models utilizing various topologies. These various topologies could include a two layer processor. Further, in col. 3 lines 37 – 38, Castelaz teaches of a "typical" neural net model, again leaving the possibility that other models may be used. If the applicant wishes to maintain such an assertion that a two layer neural network processor cannot be used to function as Castelaz neural network processor, the Examiner respectfully requests the Applicant provide evidence

such as another reference, a citation in Castelaz or an Affidavit or Declaration under CFR.1.132.

Furthermore, regardless of whether or not Castelaz is able to function as a two layer network, the limitations stated within the claim do not explicitly state that the neural network is only two layers. The limitation "wherein the steps of determining the first and second variations are performed utilizing two-layer neural network processing" leaves the possibility that those two steps of determination are performed using two layers, but there could be other layers to the processing system. For examiner, there may be an input layer, a layer for determining first variations, and a layer for determining second variations. Thus this would include 3 layers but there would still be two layer processing for determining the variations, i.e. the 2nd and 3rd layer. As such this argument is not persuasive.

Applicant further alleges:

> "Moreover, the ATSC reference does not teach or suggest using neural network processing much less how such processing could be configured to accomplish audio data encoding. The Castelaz et al. reference does not provide the necessary teaching to one of ordinary skill on how to adapt the neural network signal processor of Castelaz et al. so that it will function within the AC-3 Digital Audio Compression Standard of the ATSC reference."

Examiner has considered this argument and respectfully disagrees. Applicant is suggesting that it is necessary to adapt Castelaz to function within the AC-3 standard. However, this is not the case. The Castelaz reference is provided to perform the step of determining the first and second variations. These are mere calculations which can be

computed using any digital processing method. The Castelaz method suggests calculating data for audio signals and thus this calculation could be performed on the neural network taught by Castelaz. The Castelaz portion of the modified reference is merely doing the calculations, not the encoding. As such this argument is not persuasive.

Applicant further alleges:

> "Even if one were motivated to attempt such a combination, it would fall short of the invention as recited in claim 1 because it would attempt to use a three-layer neural network processor instead of a two-layer neural network processor. In view of the foregoing, applicants respectfully submit that claim 1 is clearly allowable over the references cited and applied by the Examiner."

Examiner has considered this argument and respectfully disagrees for the same reasons stated above regarding the two and three layer neural network argument.

Applicant further alleges:

> "For example, claim 2 recites the exponent coding strategy being assigned from a plurality of exponent coding strategies having different differential coding limits. Nowhere does the ATSC reference describe or suggest using different differential coding limits."

Examiner has considered this argument and respectfully disagrees. Examiner points to page 45 of the ATSC specification for further clarification; in which it is taught that exponent values have been limited in either range or resolution and that different size exponents have different limits.

Applicant's arguments with respect to claims 17, 31 and 45 have been considered but are moot in view of the new ground(s) of rejection as required by the newly added limitations.

Allowable Subject Matter

Claims 48 – 66 are allowed.

Claims 12 – 16, 26 – 30, 36 - 44 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew C. Flanders whose telephone number is (571) 272-7516. The examiner can normally be reached on M-F 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571) 272-7848. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

acf

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